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their research, Foster said, while the United States increased its effort by 35 per cent.

One of the products of the research by both sides is the spy satellite. Originally designed to pry out information that would help each country design new weapons, the observation satellite could end up as the policeman for the treaty designed to reduce the need for such weapons.

Both sides keep their satellite reconnaissance activities very much under wraps; Pentagon security is even tighter than the Kremlin's in this area. But, with a little space detective work, a great deal can be learned about how the United States and the Soviet Union keep each other on camera most of the time.

The Soviets launch their eyes in the sky from Plesetsk and Tyuratam. The satellites used to stay up for eight days, but more recently for 12. The cameras are turned on when the satellites go over areas of special interest, such as U.S. military bases or the fleet deployed for the recent French nuclear tests.

In June, when the French were setting up for their nuclear tests off Tahiti, the Soviets flew five observation satellites—a record for this year. They bore the cover names of Cosmos 223, 224, 227, 228 and 229.

Western space specialists believe the Soviet eye in the sky is a modified Vostok spaceship, the type flown by the first cosmonauts. The craft and its load of film is brought down to earth in deserted reaches of the Soviet Union. As it floats down to earth by parachute, the spacecraft sends out radio signals so it can be found quickly.

The United States launches its observation satellites from the Air Force's Western Test Range in California. The rocket used has been perfected to enable the spacecraft to swoop down as close as 50 miles above the earth for close-up pictures—presumably by a zoom lens.

But unlike the Soviet spacecraft, the U.S. satellite does not make a soft landing on the earth. Instead, its package of film is jettisoned out over the ocean and snatched in midair by a plane dispatched to make the highly secret rendezvous. The capsule is designed to sink if there is a miss.

On most days, there is at least one observation satellite looking down from space. The pictures they take are described as "fantastically detailed" by American officials who have seen them. U.S. officials used to brag that they could take a picture of an object as small as a dinner plate. Now they claim they can pick out a button on a man's shirt.

This kind of detail enables the superpowers to keep track of missile deployment and troop movements. They can even count horses and tractors to get an idea on how advanced an economy is.

The observation satellites, as one specialist put it, make monitoring a missile treaty mechanically "an acceptable risk." They may prove the way of getting around Soviet objections to on-site inspection that have derailed arms negotiations in the past.

If a formal missile treaty is negotiated, its endorsement by the Joint Chiefs is vital to hopes for Senate approval. The Chiefs supported the nuclear test ban treaty and might well back a missile freeze if they could be convinced the treaty would not allow the Soviets to make a weapons breakthrough.

If a missile agreement is not negotiated, here are some of the new strategic weapons on the Joint Chiefs' shopping list:

• Improved Capability Missile (ICM)—This would be a nuclear "Big Bertha," its warhead several times the power of the one-megaton Minuteman 3. It would be buried deep in the ground so an enemy H-bomb could not destroy it. The Soviets have an SS-9 ICBM which can lift a bomb of between 12 and 25 megatons. The ICM would be partly in answer to the SS-9.

• Antiballistic missiles (ABM)—The Chiefs want to invest up to $20 billion in a defense against Soviet missiles, beyond the $6 billion Chinese shield under way. McNamara fought this as a waste of money. He said that Soviet ICBMs would get through any defense, no matter how elaborate, and that the defense sought by the Chiefs would end up costing $40 billion. The Chiefs not only still want this thick defense but are looking into putting antimissile missiles on ships and in planes.

• New bomber—The Air Force considers the bomber version of the F-111A only a stopgap, a replacement for the older B-52s. The service wants a supersonic bomber that could fly in low, under enemy defenses. Cost estimates are $8 billion for 210 of the new bombers and $23 billion to buy and maintain them for 17 years. Lawmakers protest that a new bomber has been kept in the study stage too long. Many insist it is time to get started.

• New bomber defense—The Soviet Union is not building up its bomber force, but it might. So the Joint Chiefs want to build a defense just in case. The present bomber defense around the United States does little good against planes flying in low. The new system would put the detection radar up in an airplane so it could look down to pick out any low-flying bombers. The F-12 fighter to go with this new system would cost about $20 million a copy. The price tag for the whole system would be $14 billion.

The Soviets would take countermeasures against these and other weapons advances by the United States. This action-reaction phenomenon is what increases arms spending on both sides.

The nuclear missile treaty—like a Holy Grail of man's hopes—may never be within any closer reach than it is right now.